

### **Amendments to the Claims**

This listing of claims will replace all prior versions and listings of claims in this application.

### **Listing of Claims**

Claims 1-44 (cancelled).

Claim 45 (currently amended). A method of identifying environmental parameters of interest by identifying the presence and abundance of a nucleic acid marker sequence comprising the steps of:

- a. providing a soil environmental sample containing a population of interest;
- b. isolating genomic DNA from the soil environmental sample;
- c. performing a diagnostic PCR-based assay on the genomic DNA utilizing a plurality of species-specific probes to the nucleic acid marker sequence that shows a correlation to the parameter of interest; and
- d. inferring the presence of the parameter of interest based upon the presence of the nucleic acid marker sequence.

Claim 46 (currently amended). A method of identifying environmental parameters of interest by identifying the presence and abundance of a nucleic acid marker sequence comprising the steps of:

- a. providing a soil environmental sample containing a population of interest;
- b. isolating genomic DNA from the soil environmental sample;
- c. performing a hybridization-based assay on the genomic DNA utilizing a species-specific probe to the nucleic acid marker sequence that shows a correlation to the parameter of interest; and

d. inferring the presence of the parameter of interest based upon the presence of the nucleic acid marker sequence.

Claim 47 (previously presented). The method according to claim 45 or claim 46, wherein the nucleic acid marker shows a perfect correlation to the parameter of interest.

Claim 48 (previously presented). The method according to claim 45 or claim 46, wherein the nucleic acid marker shows a high degree of correlation to the parameter of interest.

Claim 49 (previously presented). The method according to claim 45 or claim 46, wherein the nucleic acid marker shows a moderate degree of correlation to the parameter of interest.

Claim 50 (previously presented). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is a subsurface oil or natural gas deposit.

Claim 51 (withdrawn). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is a dynamic change that occurs during an oil and gas deposit's development that affect its hydrocarbon composition, migration, depletion, and hydrogen sulfide production.

Claim 52 (withdrawn). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is a mineral deposit.

Claim 53 (withdrawn). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is an indicator of the mineral deposit's composition.

Claim 54 (withdrawn). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is an agricultural pest.

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Claim 55 (withdrawn). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is an industrial organic chemical.

Claim 56 (withdrawn). The method according to claim 45 or claim 46, wherein the environmental parameter of interest is water.